Development of Mathematics and Physics

Regarding the development of mathematics, the greatest benefit was the recovery of the Euclidian theoretical explanation of the scientific problems and its use for the questioning of the truthfulness of the scientific theories. The next step was the extension of mathematics to all physical sciences. The most important practical improvement was the introduction of the Arabic numerals, which have originated in India, by the Italian mathematician Leonardo Fibonacci of Pisa (c. 1170-1250) in his work Liber Abaci written in 1202. Soon they had completely expulsed the Roman numerals from the everyday use. Finally they have provided the turning point in the development of the Gothic architecture, which means that they had found their full practical usage only within the Latin West (cf. Crombie, 1959).

In the context of mathematics, one cannot continue without mentioning the 15th Century German philosopher and theologian Nicholas of Kues (1401-1464) who exercised the roles of a papal legate to the Holy Roman Empire of the German Nation, a cardinal and a prince-bishop of Brixen, and finally of a vicar general in the Papal States. During his education at the Universities of Heidelberg, Padua and Cologne, he was not only acquainted with the works of the ancient authorities, but was also involved in the disputations with his contemporary philosophers. In his works De Docta Ignorantia, De Visione Dei, and De Conjecture, he talked of the possibility of knowing God only with the help of the divine human mind, and not just with the mere human means, which he called “learned ignorance.” Among other things, he wrote on squaring the circle and claimed that the Earth was a star like the other stars, that it was not the center of the Universe, and was thus not at rest, nor that its poles were fixed. In medicine he had introduced the counting of pulse, through the comparison of the rate of pulses and the weighing of the quantity of water which had run out of a water clock, while the pulse had beaten one hundred times (cf. McGinn, 2005).

The above mentioned improvements in the field of mathematics had an impact on the field of physics. Greek philosophers had developed only the mathematics of the objects at rest, while the 13th Century natural philosophers have also developed the mathematics of the motion. The 1277 condemnation had caused the rise of the new physical theories, which described the Universe as infinite, void, and without a center, which was in the opposition with the Aristotle’s claims. During the Developed Middle Ages at the University of Oxford a new theory was developed that connected the assimilation of weight to the magnetic attraction.

According to it the tendency of a heavy body towards a moving center was the same as the tendency of an iron towards a moving magnet. Although this theory was later proved false according to the contemporary understandings, it had still represented an original explanation and an undoubted improvement of the previous Aristotle's theory of gravity, which claimed that all objects had tendency of moving towards the sphere of their origination (cf. Crombie, 1959).

The above mentioned interest in the motion led to the development of the theory of the impetus, formulated by the French priest Jean Buridan (c. 1300-1358). It tried to explain the continuity of a motion of a body without the preserved contact with the cause of its motion through the impetus given to the projectile by the thrower, and which would then continue to move as long as the impetus remained stronger than the resistance, which clearly represents a predecessor to the concept of the inertia. The mentioned theory had its practical use in the regulation of the motion of the projectiles and was useful in the explanation of the rotations of the stars and the planets (cf. Duhem, 1985). These examples clearly show that during the Middle Ages physics, as the main natural science, was developing and not stagnating. Although some of these medieval theories were later proved to be false according to the contemporary understandings, one should bear in mind that the same thing is true for some theories from the Antiquity or the Renaissance as well, so the attribute of falsity can not only be connected with the Medieval Latin Science.

Kaynak:

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